United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

CONTOUR ORCHARD AND OTHER PERENNIAL CROPS

CODE 331

(ac)

DEFINITION

Planting orchards, vineyards, or other perennial crops so field operations are performed on or near the contour.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Reduce sheet and rill soil erosion
- Reduce sediment transport to surface waters
- Improve water infiltration rate

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on sloping land where orchards, vineyards, or other perennial crops will be established in defined rows. For annually planted crops use NRCS Conservation Practice Standard (CPS) Contour Farming (Code 330).

CRITERIA

General Criteria Applicable to All Purposes

Where sites are disturbed, install temporary erosion control measures until plantings are established.

Divert overland flow from adjacent sites to ensure successful establishment and function of this practice.

Do not apply this practice on areas with evidence of mass soil movement or that have the potential for landslides.

Row grade

Align row grades as close to the contour as possible. Where it is not possible or desirable to follow the contour, the maximum row grade must not exceed—

- One-half of the up and downhill slope percent used for conservation planning, or
- Four percent (or 10 percent when cover is provided in the alleys), whichever is less.

Up to a 25 percent deviation from the design row grade is permitted within 150 feet of a stable outlet.

When the row grade reaches the maximum design grade, establish a new baseline up or down slope from the last contour line and begin a new layout on the contour.

Design the row grade with positive row drainage of not less than 0.2 percent on slopes where ponding is a concern. This includes sites with soils with slow to very slow infiltration rates (soil hydrologic groups C or D), or where crops are sensitive to ponded water.

Critical slope length
Use current erosion prediction technology to determine the critical slope length.

When the critical slope length is exceeded shorten slope lengths using diversions, terraces, or other structures.

Stable outlets
Deliver runoff from contour rows to a stable outlet.

CONSIDERATIONS

Fields that are cut by gullies or have strongly undulating topography are not well-suited for this practice due to the difficulty of meeting the row grade criteria.

A topographic survey, topographic map, or LiDAR map can assist with the desired contour planting pattern.

Where slow drainage may increase disease problems, or where furrows could fill with water and overtop, following the level contour may not be desirable.

Outward sloping benches are subject to erosion from runoff from above the bench.

This practice works best in combination with vegetative ground cover and suitable irrigation conveyance practices.

Vegetative ground cover in alleys of tree or vine plantings, in row furrows, and on terraces and diversions can increase infiltration, reduce runoff, aid in controlling erosion, provide habitat for beneficial species and pollinators, and facilitate nutrient cycling.

Compaction from equipment tracks can divert water and cause erosion.

Plan row spacing of perennial crops to accommodate equipment travel at mature width.

PLANS AND SPECIFICATIONS

Develop plans and specifications for each field or treatment unit according to the Criteria and Operation and Maintenance section requirements. Specifications must describe the requirements to apply this practice to achieve the intended purpose. Record practice specifications on the NRCS CPS Contour Orchards and Other Perennial Crops (Code 331) implementation requirements document. Plans and specifications will include—

- Percent land slope used for conservation planning.
- The minimum and maximum allowable row grades for the contour system.
- A sketch map or photograph of the field showing—
  - Contours of the field.
  - Approximate location of the baselines used to establish the system.
  - Location of stable outlets for the system.
- Temporary cover specifications.
- The evaluation report of the conservation system using the currently approved water erosion prediction technology.

OPERATION AND MAINTENANCE

Maintenance needed for this practice includes—

- Performing all field operations between tree or vine rows on or near the contour.
- Periodic inspection and repairs to runoff water outlets.
- Protecting farm roads from erosion caused by row runoff.
- Maintaining adequate vegetative cover to control erosion.

REFERENCES

Foster, G.R., D.C. Yoder, G.A. Weesies, D.K. McCool, K.G. McGregor, and R.L. Binger. 2003. Revised Universal Soil Loss Equation (RUSLE2), Version 2, User's guides. USDA.

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder. 1997. USDA Agriculture Handbook 703, Predicting soil erosion by water: a guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE). Washington, D.C.